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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,790	02/23/2004	Kazuhide Tanaka	A8319.0035/P035	5538

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EXAMINER	
WARTALOWICZ, PAUL A	

ART UNIT	PAPER NUMBER
1735	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/782,790	TANAKA ET AL.	
	Examiner	Art Unit	
	PAUL WARTALOWICZ	1735	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 August 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *9-12,14-17 and 19-28* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☒ Claim(s) *25-28* is/are allowed.

7)☒ Claim(s) *9-12,14-17 and 19-22* is/are rejected.

8)☒ Claim(s) *23,24* is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 08/24/2011 have been fully considered but they are not persuasive.

Applicant argues that Thieme does not disclose or render obvious the feature of a metallurgical bond (involving some diffusion) rather than just a mechanical bond and that the it would recognized by one of skill in the art that the claimed "junction auxiliary material" is a particular type of material that operates to unify different materials through diffusion bonding.

However, it appears that Thieme teaches a substantially similar material for the layer designated in the claims as a "junction auxiliary material" (See applicant's claims at claim 1, line 9, 13, inter alia). It is unclear what structurally distinguishes the copper junction auxiliary (brazing) material of the claims from the copper matrix of Thieme. It appears that the copper matrix of Thieme is substantially structurally similar to the claimed copper junction auxiliary (brazing) material absent a showing to the contrary.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 9, 10, 14, 15, 19, and 20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tosmic (US 2002/0198111).

Tosmic teaches a superconductor wire wherein an inner barrier (meets the limitation of the metal cladding layer comprising nickel, inter alia; claim 12) surrounds the superconductor powder, a stabilizer layer (meets the limitation of the intermediate layer comprising copper, inter alia, claim 14) surrounds the inner barrier, and an outer tube (meets the limitation of the base metal member comprising carbon steel, inter alia, para. 0017) surrounds the stabilizer layer prior to heat treatment for the purpose of preventing unwanted chemical reactions during the heating process (para. 0017, 0021).

Additionally, it appears that Tosmic teaches a substantially similar material for the layer designated in the claims as a "junction auxiliary material" (See applicant's claims at claim 1, line 9, 13, inter alia). It is unclear what structurally distinguishes the copper junction auxiliary (brazing) material of the claims from the copper layer of

Tosmic (claim 14). It appears that the copper layer of Tosmic is substantially structurally similar to the claimed copper junction auxiliary (brazing) material absent a showing to the contrary.

As to the limitation of "is assembled into", it is unclear how this limitation lends a patentable distinction between the claimed invention and the prior art. It appears that the prior art meets this limitation as the superconductor and covering metal are abutting the base material (outer covering).

Additionally, it appears that the inner barrier layer (cladding layer) has an electric resistance of 7 μΩ or less at room temperature for other embodiments when formed of nickel, *inter alia*. Additionally, it appears that for some embodiments the (diffusion barrier) cladding layer inherently has a Vickers hardness of at least 50 at room temperature as it is made of a similar element, eg. iron, as that instantly claimed.

Additionally, it appears that the laminate (metal base member) can have a Vickers hardness of at least 50 at room temperature as it is made of a substantially similar element, eg. carbon steel, as that instantly claimed. Additionally, it appears that for some embodiments the laminate (metal base member) inherently has an electric resistance of 7 μΩ or less at room temperature as it is made of a substantially similar element, eg. copper and nickel, as that instantly claimed.

Regarding the limitation of the junction auxiliary material electrically and mechanically unified and integrated metallurgically with the base member and cladding layer in a unitary block and that there would not be a gap formed between the metal base wire member and the cladding layers, applicant's specification recites that the

assembled pipe is treated at a temperature from 800-1000℃ to form the unitary block (page 20, lines 19-27).

It appears that the heat process of Tosmic takes place at temperatures (800-1000℃, para. 0020) substantially similar to the temperatures at which the unitary block is formed (800-1000℃,page 20, lines 19-27) such that one of ordinary skill would recognize that the product produced by the heat treatment of Thieme would inherently exhibit the junction auxiliary material electrically and mechanically unified with the base member and cladding layer in a unitary block and that there would not be a gap formed between the metal base wire member and the cladding layers.

Regarding claims 14 and 19, Tosmic teaches that the diffusion barrier surrounding the superconductor comprises nickel alloys and molybdenum (this layer corresponds to the metal cladding layer of the instant claims, [0016]).

Regarding claims 15 and 20, Tosmic teaches that the laminate (metal base member) comprises nickel alloys [0023].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9, 10, 12, 14, 15, 17, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Tosmic (US 2002/0198111).

Thieme et al. teach magnesium boride superconducting wires [0002] wherein the magnesium boride, having a density greater than 95% (Abstract) is surrounded by tantalum, niobium, nickel, nickel alloys, iron, or molybdenum, wherein the wire further comprises a metal laminate on the outside of this barrier layer selected from copper, copper alloys, stainless steel, aluminum, aluminum alloys, or nickel alloys [0016]-[0018].

Additionally, it appears that Thieme teaches a substantially similar material for the layer designated in the claims as a "junction auxiliary material" (See applicant's claims at claim 1, line 9, 13, inter alia). It is unclear what structurally distinguishes the copper junction auxiliary (brazing) material of the claims from the copper matrix of Thieme. It appears that the copper matrix of Thieme is substantially structurally similar to the claimed copper junction auxiliary (brazing) material absent a showing to the contrary.

Additionally, Thieme et al. teach a diffusion barrier surrounding the superconductor comprising iron, nickel alloys, tungsten, and molybdenum (this layer corresponds to the metal cladding layer of the instant claims, [0016]) wherein the matrix, which overlays the diffusion barrier layer, is copper (this layer corresponds to the junction material between the base metal and the metal cladding of the instant claims, [0015]), wherein the laminate, overlaying the matrix, is made of copper alloy, *inter alia* (this layer corresponds to the metal base of the instant claims, [0018]).

Additionally, it appears that the diffusion barrier layer (cladding layer) can have an electric resistance of 7 μΩ or less at room temperature for other embodiments when formed of nickel, *inter alia*. Additionally, it appears that for some embodiments the (diffusion barrier) cladding layer inherently has a Vickers hardness of at least 50 at room temperature as it is made of a similar element, eg. iron, as that instantly claimed.

Additionally, it appears that the laminate (metal base member) can have a Vickers hardness of at least 50 at room temperature as it is made of a substantially similar element, eg. stainless steel containing iron, as that instantly claimed. Additionally, it appears that for some embodiments the laminate (metal base member) inherently has an electric resistance of 7 μΩ or less at room temperature as it is made of a substantially similar element, eg. copper and nickel, as that instantly claimed.

Additionally, as the laminate (metal base member) covers the matrix (junction auxiliary material) and the barrier layer (cladding layer) [0018], it appears that the metal base member is coaxial with the tubular-shaped metal cladding layer.

Thieme teaches that one or more Mg-B regions are embedded in the matrix [0012]. It appears that a barrier layer (cladding layer) would accompany each Mg-B region [0016] such that there is a plurality of cladding layers as in instant claims 21, 22.

Regarding the limitation of the junction auxiliary material electrically and mechanically unified and integrated metallurgically with the base member and cladding layer in a unitary block and that there would not be a gap formed between the metal base wire member and the cladding layers, applicant's specification recites that the

assembled pipe is treated at a temperature from 800-1000℃ to form the unitary block (page 20, lines 19-27).

Thieme fails to explicitly teach that the heat treatment at paragraph 0095 takes place with the laminate thereon. However, Tosmic teaches a superconductor wire wherein an inner barrier (tantalum, inter alia, claim 12) surrounds the superconductor powder, a stabilizer layer (copper, inter alia, claim 14) surrounds the inner barrier, and an outer tube (copper, inter alia, para. 0017) surrounds the stabilizer layer prior to heat treatment for the purpose of preventing unwanted chemical reactions during the heating process (para. 0017, 0021).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide an inner barrier (tantalum, inter alia, claim 12) surrounds the superconductor powder, a stabilizer layer (copper, inter alia, claim 14) surrounds the inner barrier, and an outer tube (copper, inter alia, para. 0017) surrounds the stabilizer layer prior to heat treatment in the superconductor wire of Thieme in order to prevent unwanted chemical reactions during the heating process (para. 0017, 0021) as taught by Tosmic.

Additionally, it appears that the heat process of Tosmic takes place at temperatures (800-1000℃, para. 0020) substantially similar to the temperatures at which the unitary block is formed (800-1000℃,page 20, lines 19-27) such that one of ordinary skill would recognize that the product produced by the heat treatment of Thieme would inherently exhibit the junction auxiliary material electrically and mechanically unified with the base member and cladding layer in a unitary block and

that there would not be a gap formed between the metal base wire member and the cladding layers.

Where the claimed and prior art product(s) are identical or substantially identical, the burden of proof is on applicant to establish that the prior art product(s) do not necessarily or inherently possess the characteristics of the instantly claimed product(s), see In re Best, 195 USPQ 430.

Any difference imparted by the product by process limitations would have been obvious to one having ordinary skill in the art at the time the invention was made because where the examiner has found a substantially similar product as in the applied prior art the burden of proof is shifted to the applicant to establish that their product is patentably distinct not the examiner to show the same process of making, see In re Brown, 173 USPQ 685, In re Fessmann, 180 USPQ 324, In re Spada, 15 USPQ2d 1655, In re Fitzgerald, 205 USPQ 594 and MPEP 2113.

As to the limitation of "is assembled into", it is unclear how this limitation lends a patentable distinction between the claimed invention and the prior art. It appears that the prior art meets this limitation as the superconductor and covering metal are abutting the base material (outer covering).

Regarding claims 12 and 17, Thieme teaches that the magnesium boride has a density greater than 95% (Abstract).

Regarding claims 14 and 19, Thieme teaches that the diffusion barrier surrounding the superconductor comprises nickel alloys and molybdenum (this layer corresponds to the metal cladding layer of the instant claims, [0016]).

Regarding claims 15 and 20, Thieme teaches that the laminate (metal base member) comprises nickel alloys [0018].

Regarding claim 21, Thieme teaches that the laminate (metal base member) comprises stainless steel (which includes iron) [0018].

Claims 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thieme et al. (U.S. 2003/0036482) in view of Tosmic (US 2002/0198111) and Nakahara et al. (U.S. 6337307).

Thieme et al. teach a compound sheath as described above.

Thieme et al. fail to teach a plurality of the single-core or multi-core wires are assembled into the base metal and they are twisted.

Nakahara et al. teach a superconductor (col. 1) wherein a plurality of single-core wires are assembled into a base metal that are twisted (col. 11-12).

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a plurality of single-core wires assembled into a base metal that are twisted in Thieme et al. in order to produce a known superconducting wire as taught by Nakahara et al.

Allowable Subject Matter

Claims 23 and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior of record does not teach or suggest the compound sheath of claims 21 and 22, respectively further comprising that the intermediate layer is a tin alloy. Specifically, the closest prior art, U.S. 2003/0036482, teaches an intermediate layer but fails to teach or suggest that the intermediate layer comprises tin. Additionally, it would not have been obvious to one of ordinary skill in the art that the intermediate layer comprise tin in the absence of applicant's disclosure.

Claims 25-28 are allowed.

The following is an examiner's statement of reasons for allowance: the prior of record does not teach or suggest the compound sheath of claims 25 and 27, respectively further comprising that the intermediate layer is a tin alloy. Specifically, the closest prior art, U.S. 2003/0036482, teaches an intermediate layer but fails to teach or suggest that the intermediate layer comprises tin. Additionally, it would not have been obvious to one of ordinary skill in the art that the intermediate layer comprise tin in the absence of applicant's disclosure.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL WARTALOWICZ whose telephone number is

(571)272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on (571) 272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paul A Wartalowicz/
Primary Examiner, Art Unit 1735